REMARKS

By this amendment, claims 1, 7-9, 15-17, and 19 have been amended, and new claims 29-30 have been added. Accordingly, claims 1-2, 7-10, and 15-30 are pending in the present application. The claim amendments and new claims are supported by the specification and claims as originally filed, with no new matter being added. Accordingly, favorable reconsideration of the pending claims is respectfully requested.

Applicants have amended the specification to update the priority data, to correct typographical errors, and for clarity.

1. Rejections Under 35 U.S.C. § 103(a)

Claims 1-2, 7-10, and 15-20 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,780,908 to Sekiguchi et al. (hereinafter "*Sekiguchi*") in view of U.S. Patent No. 6,077,774 to Hong et al. (hereinafter "*Hong*") for the reasons set forth on pages 2-3 of the Office Action. Claims 1-2, 7-10, and 15-20 have also been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sekiguchi* in view of U.S. Patent No. 6,114,238 to Liao (hereinafter "*Liao*") for the reasons set forth on pages 3-4 of the Office Action. Applicants respectfully traverse.

In rejecting the above claims, the Examiner stated that the previous indication of allowability of independent claims 7-8 and 15-16 has been withdrawn because the scope of the claims was changed by replacing the limitation "ammonia and its derivatives" with "ammonia or derivatives thereof" in the last amendment filed by Applicants.

Accordingly, independent claims 1, 7-9, 15-17, and 19 have been amended to replace the limitation "ammonia or derivatives thereof" with "ammonia and derivatives thereof". There is no teaching or suggestion in *Sekiguchi*, *Hong*, or *Liao* of such a claimed feature.

Accordingly, claims 1-2, 7-10, and 15-20 would not have been obvious over the cited references, and Applicants respectfully request that the rejection of these claims under 35 U.S.C. § 103(a) be withdrawn.

2. Allowable Subject Matter

Applicants gratefully acknowledge the Examiner's indication that claims 21-28 would be allowable if rewritten in independent form. Applicants submit that claims 21-28 are now allowable without being rewritten in independent form in light of the claim amendments discussed above with respect to independent claims 1, 7-9, 15-17, and 19.

3. New Claims

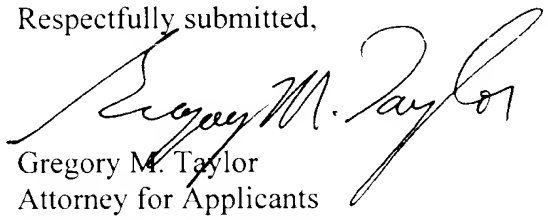
New independent claims 29-30 are similar to independent claims 1 and 17, except that claims 29-30 recite a passivation layer comprising a nitrogen-containing silane. Support for this limitation in the new claims can be found on page 12, lines 22-23 of the specification. There is no teaching or suggestion in the cited references of such a claimed feature. Accordingly, claims 29-30 also present patentable subject matter.

CONCLUSION

In view of the foregoing, Applicants respectfully request favorable reconsideration and allowance of the present claims. In the event the Examiner finds any remaining impediment to the prompt allowance of this application which could be clarified by a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney.

Dated this 2nd day of November 2001.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW THE CHANGES MADE

IN THE SPECIFICATION:

The paragraph beginning at page 2, line 2 of the specification has been amended as follows:

This is a divisional of US Patent Application Serial No. 09/143,289, filed on August 28, 1998, titled "PLASMA TREATMENT OF AN INTERCONNECT SURFACE DURING FORMATION OF AN INTERLAYER DIELECTRIC", now U.S. Patent No. 6,150,257, which is incorporated herein by reference.

The paragraph beginning at page 15, line 23 of the specification has been amended as follows:

The removal of ammonia from the mixture may be carried out incrementally. For example, the elimination of ammonia from the mixture may be initiated by decreasing the ammonia portion of the mixture by a preferred percentage of the entire amount of ammonia over a period of time. Specifically, the amount of ammonia may be decreased every five seconds by about 5%, such that after about 100 seconds, the amount of ammonia in the feed mixture is reduced to about zero. Alternatively the amount of ammonia may be decreased every five seconds by 10%, such that after about one minute, the amount of ammonia in the feed mixture is reduced to about zero. Alternatively, the amount of ammonia may be decreased by about 25% every five seconds such that after about twenty seconds, the amount of ammonia in the feed mixture has been reduced to about zero. Additionally, the amount of ammonia may be decreased by 50% every five seconds such that after about ten seconds, the amount of ammonia in the feed mixture is reduced to about zero. Finally, the amount of ammonia in the feed mixture may be reduced from 100% to about zero after any five-second time increment [to about zero from 100%] in a single step.

IN THE CLAIMS:

Claims 1, 7-9, 15-17, and 19 have been amended as follows:

1. (Twice Amended) A semiconductor structure comprising:

an electrically conductive interconnect disposed within a first dielectric layer, said electrically conductive interconnect having an upper surface;

a passivation layer disposed upon said upper surface, said passivation layer comprising ammonia [or] and derivatives thereof adsorbed upon said upper surface; and

an interlayer dielectric disposed upon said first dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface.

7. (Twice Amended) A semiconductor structure comprising:

an electrically conductive interconnect having an upper surface and being disposed within a dielectric layer, said electrically conductive interconnect including:

a titanium liner layer disposed within a depression in said dielectric layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer and filling said depression;

a first passivation layer comprising a tungsten nitride compound and being disposed upon said upper surface;

a second passivation layer comprising ammonia [or] and derivatives thereof adsorbed upon said first passivation layer; and

an interlayer dielectric disposed upon said dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface.

8. (Twice Amended) A semiconductor structure comprising:

an electrically conductive interconnect disposed within a dielectric layer, said electrically conductive interconnect having an upper surface and including:

a titanium liner layer disposed within a depression in said dielectric layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer and filling said depression;

a passivation layer disposed upon said upper surface comprising ammonia [or] and derivatives thereof adsorbed upon said upper surface; and

an interlayer dielectric disposed upon said dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface.

9. (Twice Amended) An interconnect in an electronic device comprising:

a metallic first structure disposed within a first silicon oxide layer, said metallic first structure having an upper surface;

a passivation layer disposed upon said upper surface, said passivation layer comprising ammonia [or] and derivatives thereof adsorbed upon said upper surface; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

15. (Twice Amended) An interconnect in an electronic device comprising:

a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface and including:

a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer;

a first passivation layer disposed upon said upper surface and comprised of a tungsten nitride compound;

a second layer comprising ammonia [or] and derivatives thereof adsorbed upon said first passivation layer; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

16. (Twice Amended) An interconnect in an electronic device comprising:

a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface and including:

a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer;

a passivation layer disposed upon said upper surface and comprised of ammonia [or] and derivatives thereof adsorbed upon said upper surface; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

17. (Once Amended) A semiconductor structure comprising:

an electrically conductive interconnect disposed within a first dielectric layer, said electrically conductive interconnect having an upper surface;

a first passivation layer disposed upon said upper surface, said first passivation layer comprising a tungsten nitride compound;

a second passivation layer adsorbed upon said first passivation layer, said second passivation layer comprising ammonia [or] and derivatives thereof; and

an interlayer dielectric disposed upon said first dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface.

19. (Once Amended) An interconnect in an electronic device comprising:

a metallic first structure disposed within a first silicon oxide layer, said metallic first structure having an upper surface;

a first passivation layer disposed upon said upper surface, said first passivation layer comprising a tungsten nitride compound;

a second layer adsorbed upon said first passivation layer, said second layer comprising ammonia [or] and derivatives thereof; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.